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TWO SUMMERS OF BOTANIZING IN NEWFOUNDLAND.

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(*Continued from p. 178.*)

Salix cordifolia Pursh. *S. cordifolia* is the most variable willow of northwestern Newfoundland, Labrador, the Mingan Islands and the Shickshock Mountains. As already pointed out by Schneider,[1] it includes most of the material which has passed in eastern America as *S. glauca* L.; but so very diverse are the extremes in the American series that it is quite unsatisfactory to treat them, as is done by Schneider, merely as two varieties. For instance, such a shrub as that originally described by Pursh, with broadly ovate cordate-based leaves and densely villous stout branchlets, is not satisfactorily treated as identical with *S. callicarpaea* Trautvetter, well illustrated and clearly described, with elliptic to narrowly ovate leaves rounded to attenuate at base. Nor are these satisfactorily identified with the large shrub occurring along the Straits of Belle Isle, with slender glabrous branchlets and glabrous obovate leaves up to 9 cm. long and 5 cm. broad, nor with another shrub, of depressed habit, with pubescent branchlets and orbicular to short-oblong round-tipped leaves only 0.7–2 cm. broad. Yet it has thus far been impossible to find any characters of the aments which are at all concomitant with the variations of pubescence and foliage; and although the extremes are well marked and practically all material can be sorted definitely into six varieties, there are frequent transitional specimens. It is, however, more satisfactory to have for these stronger tendencies of the species definite varietal names than to force the shrubs into

[1] Schneider, Bot. Gaz. lxvi. 343 (1918).

the two or three categories provided by Schneider.[1] As a tentative classification of the American varieties of *S. cordifolia* the following arrangement is proposed. Owing to almost complete lack of knowledge of the Greenland forms of this group it has been necessary to restrict the study to the shrubs of Labrador, Newfoundland and Quebec; and eventually when the Greenland types are properly studied, some of the varietal names here used may have to be displaced.

a. New branchlets and young leaves more or less densely villous or sericeous *b*,
  b. Leaves of fruiting branches oval to ovate or obovate, cordate to rounded at base, mostly 3–7 cm. long..... Var. *typica.*
  b. Leaves of fruiting branches not cordate, if rounded at base mostly smaller or narrower *c*.
    c. Mature leaves mostly 2.5–6 cm. long, oblanceolate, oblong, elliptic or narrowly obovate.
      Leaves glabrate in maturity or merely a little silky on the nerves beneath.....Var. *callicarpaea.*
      Leaves permanently and rather densely villous....Var. *intonsa.*
    c. Mature leaves mostly only 1–2.5 cm. long, orbicular to short-oblong or narrowly obovate
      Leaves elliptic, oblong or narrowly obovate, acute or acutish.....Var. *Macounii.*
      Leaves orbicular to short-oblong, rounded at summit Var. *eucycla.*
a. New branchlets and young leaves glabrous or essentially so; leaves obovate, 2–5 cm. broad.....Var. *tonsa.*

S. CORDIFOLIA, var. **typica**, n. var. *S. cordifolia* Pursh, Fl. Am. Sept. ii. 611 (1814); Forbes, Salict. Wob. 277, fig. 143 (1829). *S. labradorica* Rydb. Bull. N. Y. Bot. Gard. i. 274 (1899) as to description, not as to later designated type.—Depressed or ascending, up to 0.5 m. high; branchlets rather stout, silky-villous: leaves of the fruiting branches oval to ovate or slightly obovate, cordate, subcordate or rounded at base, acuminate to obtuse; the fully grown 2.5–7 cm. long, 2–4.5 cm. broad, more or less silky-villous on both surfaces, sometimes becoming nearly or quite glabrate; leaves of the sprouts larger, thinner and often more strongly cordate.—The following specimens have been examined. LABRADOR: Henley Harbor, August 15, 1923, *A. G. Huntsman.* NEWFOUNDLAND: dryish limestone talus, western face of Doctor Hill, Highlands of St. John, August 24, 1925, *Fernald & Long*, nos. 27,977, 27,978; dry rocky limestone barrens, near sea-level, Ingornachoix Bay, August 1, 1910, *Fernald & Wiegand*, no. 3219.

Pursh's description of *Salix cordifolia* was very definite:

[1] Schneider treats *S. atra* Rydb. as a form and, although reducing the comparatively distinct *S. callicarpaea* Trauttv. and *S. labradorica* Rydberg, proposes *S. cordifolia* forma *hypoprionata* for the individuals of whatever leaf-outline and pubescence which exhibit a slight denticulation on some of the margins.

"S. depressa; foliis ovalibus subacutis basi cordatis integerrimis reticulato-venosis supra glabris, subtus pallidis nervo margineque pilosis, stipulis semicordatis.
In Labrador. ♄. *v. v. s. fl. in Hort. Anderson.* In general habit it resembles *S. myrsinites.*"

Such a description might have been drawn from any of the numbers above cited and it certainly seems right to identify with Pursh's description the shrub which really has oval and cordate leaves. Rydberg, apparently ignoring Pursh's description or laying more emphasis than seems justified upon the permanence of the pubescence, redescribed *S. cordifolia* as a new species, *S. labradorica*, with "young shoots more or less densely villous; leaves broadly ovate, often obtuse or subcordate at the base, rather firm, dark and glossy above, more or less glaucous beneath, on both surfaces invested with white villous hairs." But it is impossible to reconcile with Rydberg's description, "leaves broadly ovate, often obtuse or subcordate at the base," the specimen from Turner's Head, Labrador, which has been designated in the Columbia College Herbarium as the "type" of *S. labradorica;* for this "type" has elliptic-oblanceolate leaves acutish at both ends! Rydberg cites several other specimens (in the Herbarium of the Geological Survey of Canada) and presumably one or more of them agrees with his description of *S. labradorica* and Pursh's description of *S. cordifolia* in having broadly ovate cordate leaves; but if the plant designated as the "type" is to be accepted as standing for *S. labradorica*, then the description is of no account! It is surmised that the "type" was selected without consulting the description further than to pick out the first-cited specimen, which happened to be the one from Turner's Head; and the word "type" was written on the sheet, apparently by Dr. Britton, long after Rydberg had described his species.[1]

Pursh's type specimen is unknown but, as already stated, his description is well matched by actual specimens from Labrador and Newfoundland; and the figure of an oval cordate-based leaf published by Forbes, with a literal translation of Pursh's description is well matched by leaves on Fernald & Wiegand's no. 3219 or on Fernald & Long's no. 27,978. The crenulation of the margin suggested in Forbes's figure is seen on the leaves of the leading shoots of both the

[1] This case raises the question whether the description and the cited plant most nearly matching it are to be taken as of most importance, which seems the logical course; or whether the first-cited specimen, though disagreeing with the description, must be selected in lieu of a definitely cited type.

above numbers. Schneider, almost unfamiliar with true *S. cordifolia* and influenced by the specimen with elliptic or oblong leaves narrowed at base in the Hooker herbarium, was perplexed by Forbes's figure of *S. cordifolia* and was "unable to ascertain its identity."[1]

The commonest variety of *S. cordifolia* is the shrub with the leaves of the fertile branches most commonly elliptic or oblong, but varying to oblanceolate or to narrowly obovate, and narrowed or only slightly rounded at base, acute to obtuse at apex. It was a specimen of this common shrub, also cultivated in the Anderson garden, which led Hooker to remark of *S. cordifolia* Pursh: "The plant thus named for me by Mr. Borrer, who is probably acquainted with the original plant cultivated by Mr. Anderson, little deserves the appellation of *cordifolia*, its leaves being more frequently acute than retuse at the base."[2] But in view of Pursh's description and of the actual occurrence of a shrub with cordate-based ovate leaves the later specimen in Hooker's herbarium (of which a tracing is before me) cannot be taken as in any way typical of true *S. cordifolia*. This narrower-leaved shrub was well described and illustrated as *S. callicarpaea* Trautv. It should be called

S. CORDIFOLIA, var. **callicarpaea** (Trautv.), n. comb. *S. callicarpaea* Trautv. Nouv. Mém. Soc. Imp. Nat. Mosc. ii. 295, t. 7 (1832). *S. cordifolia* Trautv. l. c. 298, t. 9 (1832); Hook. Fl. Bor.-Am. ii. 152 (1839), in part; Schneider, l. c. (1918) for the most part. *S. planifolia* Hook. l. c. 150 (1839) as to Brenton plant. *S. glauca* Rydb. Bull. N. Y. Bot. Gard. i. 271 (1899) as to Labrador plant. *S. Waghornei* Rydb. l. c. (1899) in part. *S. atra* Rydb. l. c. 272 (1899).—Depressed or ascending, up to 1.7 m. high; branchlets silky-villous: leaves of the fruiting branches elliptic or oblong, varying to oblanceolate or narrowly obovate, acute to obtuse at base and apex, 2.5–6 cm. long, 1–3.5 cm broad, silky-villous when young, becoming glabrate or nearly so in age or with merely a slight silkiness on the veins beneath. The typical form of the variety (*S. callicarpaea* Trautv.) has elliptic to narrowly ovate acute leaves. *S. cordifolia*, forma *atra* (Rydb.) Schneider, Bot. Gaz. lxvi. 346 (1918) is the form with narrowly oblong to oblanceolate leaves very acute at both ends The form with obovate obtuse leaves may prove to be *S. obovata* Pursh, l. c. (1814), Forbes l. c. 278, fig. 144 (1829). The individuals which display any serrulate-denticulate margins (frequent on vigorous shoots) have been designated *S. cordifolia*, forma *hypoprionata* Schneider, l. c. (1918). None of these forms seem worth maintaining. Var. *callicarpaea* is common from northern Labrador

[1] Schneider, Bot. Gaz. lxvi. 343 (1918).
[2] Hook, Fl. Bor.-Am. ii. 152 (1839).

to northwestern Newfoundland and the Shickshock Mts., Quebec. The following belong here. LABRADOR: 20 miles north of Nakvak, *H. S. Forbes*, no. 95; Flint Island, near Port Manvers, *O. Bryant*, no. 94; 15 miles west of Nain, *H. S. Forbes*, no. 96; Indian Harbor, *Bryant*, nos. 97, 98; Gready Island, *Bryant*, nos. 90, 92, 93; Battle Harbor, *Waghorne*, no. 21 (cited by Rydberg as *S. labradorica*); Chateau Bay, *Bowdoin College Exped.* no. 78; Red Bay, *Bowdoin College Exped.*, no. 291, *Sornborger*, no. 7; Forteau, *Fernald & Wiegand*, nos. 3209, 3211, 3212, 3220, *Long*, no. 28,029; Blanc Sablon, *Fernald & Wiegand*, nos. 3223, 3225, 3226 (type of *S. cordifolia* forma *hypoprionata* Schneider), *Griscom*, no. 1. NEWFOUNDLAND: Quirpon Island, *Fernald & Long*, nos. 27,974, 28,002; Sacred Island, *Fernald & Long*, no. 28,003; Four-Mile Cove, *Fernald, Wiegand & Long*, no. 27,969; Big Brook, *Fernald & Long*, nos. 27,966, 27,996; Flower Cove, *Fernald, Long & Dunbar*, no. 26,569, *Fernald, Griscom & Gilbert*, no. 27,981; Bear Cove, *Wiegand & Pease*, no. 27,999; St. Barbe, *Fernald, Long & Dunbar*, no. 26,574; Brig Bay, *Fernald, Long & Dunbar*, no. 26,573; Bard Harbor, *Fernald & Long*, no. 28,000; Bard Harbor Hill, *Fernald, Wiegand, Long, Gilbert & Hotchkiss*, no. 27,970; St. John's Island, *Fernald, Wiegand, Long, Gilbert & Hotchkiss*, no. 28,001; Pointe Riche, *Fernald & Wiegand*, nos. 3202, 3205; Ingornachoix Bay, *Fernald & Wiegand*, nos. 3206, 3208, 3215–3217, 3222; Cape St. George, *Mackenzie & Griscom*, no. 11,043. QUEBEC: Brest, *St. John*, no. 90,845; Caribou Island, *Martin*, no. 4 (cited by Rydberg as *S. glauca*); Archipel Ouapitagone, *St. John*, no. 90,842; Archipel de Mingan, *St. John*, nos. 90,835–90,840, 90,846, *Victorin & Rolland*, nos. 18,910, 18,911, 18,913, 18,916, 18,922–18,927, 18,929–18,931; Baie Sainte-Claire, Anticosti, *Victorin*, nos. 4349–4351; Table-top Mountains, *Fernald & Collins*, nos. 212, 521; Mt. Albert, *Fernald & Collins*, no. 63; Mt. Pembroke, *Griscom & Pease*, no. 25,680a, *Fernald & Smith*, no. 25,685; Pease Basin, between Mts. Logan and Pembroke, *Fernald, Griscom & Mackenzie*, nos. 25,673, 25,674, *Pease & Smith*, nos. 25,677–25,680; pass between Mts. Logan and Fortin, *Fernald & Pease*, no. 25,008.

Var. **intonsa**, n. var., frutex depressus vel erectus ad 1.7 m. altus; ramulis villosis; foliis maturis lanceolatis vel oblanceolatis vel ellipticis vel anguste ovatis basi apiceque acutis vel obtusis dense villosis 2–4.5 cm. longis.—LABRADOR: 20 miles north of Nakvak, August 28, 1908, *H. S. Forbes*, no. 100; Makkovik, August, 1896, *A. Stecker*, no. 3; Turner's Head, Hamilton Inlet, August 6, 1892, *Waghorne*, no. 36 (the first-cited specimen of *S. labradorica* Rydb. and selected by Dr. Britton as the "type", although in its very narrow leaves acute at base contradicting Rydberg's description,—see discussion under var. *typica*); wet moss along spring-brooks on calcareous sandstone escarpment, Blanc Sablon, September 4, 1925, *Fernald & Long*, no. 28,031. NEWFOUNDLAND: spruce thickets at base of Yankee Point, July 12, 1925, *Fernald & Griscom*, no. 28,025; rocky meadows and

brook-bottoms, upper Deer Pond Brook, Highlands of St. John, August 20, 1925, *Fernald & Long*, no. 28,030 (TYPE in Gray Herb.). QUEBEC: dry granite rock-slides at 950–1200 m. altitude, southern slope of Mt. McNab, Tabletop Mts., August 1, 1923, *Fernald, Dodge & Smith*, no. 25,681.

As already noted, the Turner's Head specimen which Britton has designated as the "type" of *Salix labradorica* Rydb. belongs with *S. cordifolia*, var. *intonsa*. In its pubescence alone does it match Rydberg's description and since both his key and his description emphasize the *broadly ovate* leaves of *S. labradorica*, it seems wholly unsafe to take up for a variety of *S. cordifolia* the misbegotten name *S. labradorica*. Similarly, I am quite unable to separate *S. cordifolia*, var. *intonsa* from some specimens from Greenland which Schneider places in his species, *S. anamesa*. But one has only to read the original discussion of *S. anamesa* Schneider, Bot. Gaz. lxvi. 348 (1918) to see that it is scarcely separable from *S. cordifolia* "from which it chiefly differs by the presence of stomata in the upper leaf surface." Schneider looks upon *S. Waghornei* Rydb. as a hybrid of *S. cordifolia* and *S. anglorum*, because it resembles the former but has stomata in the upper surface of the leaves (as in *S. anglorum*). This interpretation may be correct but not all shrubs of *S. cordifolia* with villous leaves and stomata in the upper leaf-surface can be regarded as hybrids of *S. anglorum*. For instance, *Fernald & Long's* no. 28,031 from Blanc Sablon, Labrador has such stomata, yet Schneider correctly states that the southern limit of *S. anglorum* in Labrador is in latitude 55°—fully 250 miles north of Blanc Sablon. That the presence of stomata is a *specific* character separating the Greenland shrub from the American, I am quite unwillung to admit; and Schneider's memoranda on the Greenland sheets in the Gray Herbarium are specially significant: "cf. S. anamesa Schn."; "S. anglorum Cham. f. satis sericeo-pilosa vel S. anamesae forma"; "f. incerta, prob. ad S. anamesam referenda"; "ab S. anglorum typica certe distinguere non possum (an S. anamesam accedens)"; "S. anamesa Schn. videtur"; "f. mihi incerta, prob. ad S. anamesam Schn. referenda"; "S. anamesa m."; "forma incerta. S. cordifolia v. atra vel S. anamesa Schn. videtur." Until its own author can recognize *S. anamesa* its claims to specific rank are not likely to appeal to others.

Var. MACOUNII (Rydb.) Schneider, Bot. Gaz. lxvi. 347 (1918). *S. Macounii* Rydb. Bull. N. Y. Bot. Gard. i. 269 (1899). *S. Rydbergii* Heller, Cat. N. Am. Pl. ed. 2: 4 (1900). S. *vacciniformis* Rydb.

in Britt. Man. Fl. N. St. and Can. 319 (1901).—Depressed or low shrub: branchlets villous: mature leaves elliptic, oblong or narrowly obovate, acute or acutish, mostly 1–2.5 cm. long, 0.5–1.5 cm. broad, villous or glabrate,—The following are characteristic. LABRADOR: Hopedale, *Sornborger*, no. 1. NEWFOUNDLAND: Quirpon Harbor, *Huntsman;* Schooner (or Brandy) Island, Pistolet Bay, *Pease & Long*, no. 27,997; Cape Norman, *Wiegand, Griscom & Hotchkiss*, no. 27,987, 27,988; Boat Harbor, Straits of Belle Isle, *Fernald, Wiegand & Long*, no. 27,998; Big Brook, Straits of Belle Isle, *Pease & Griscom*, no. 27,985; *Wiegand, Gilbert & Hotchkiss*, nos. 27,994, 27,995; Sandy (or Poverty) Cove, *Fernald, Long & Dunbar*, no. 26,575; Savage Cove, *Fernald & Griscom*, no. 27,992; Yankee Point, *Wiegand & Hotchkiss*, no. 27,984; Flower Cove, *Mary E. Priest*, no. C1, *Fernald, Long & Dunbar*, no. 26,571, *Fernald, Griscom & Gilbert*, no. 27,980; Ice Point, *Wiegand, Gilbert & Hotchkiss*, no. 27,993; Brig Bay, *Fernald, Long & Dunbar*, nos. 26,572, 26,578; Ingornachoix Bay, *Fernald & Wiegand*, nos. 3203, 3207, 3218, 3221; Bonne Bay, *Fernald & Wiegand*, nos. 3229, 3230, *Kimball*, nos. 136, 137; Baccalieu Island, Notre Dame Bay, *Sornborger*. QUEBEC: Caribou Island, *Martin*, no. 2; Ile à la Vache Marine, Mingan, *Victorin & Germain*, nos. 18,915, 18,932; Ellis Bay, Anticosti, *John Macoun*, no. 18,830 (TYPE); Fernald Pass, between Mts. Mattaouisse and Fortin, *Fernald, Griscom, Mackenzie, Pease & Smith*, no. 25,670; Pease Basin, between Mts. Logan and Pembroke, *Fernald, Griscom & Mackenzie*, nos. 25,671, 25,672, 25,675.

Var. **eucycla**, n. var., var. *Macounii* similis, foliis orbicularibus vel breviter oblongis apice rotundatis 0.7–2 mm. latis.—NEWFOUNDLAND: turfy limestone barrens, Captain Point, Flower Cove, July 27, 1924, *Fernald, Long & Dunbar*, no. 26,570; limy barrens southeast and south of Flower Cove, July 10, 1925, *Wiegand, Pease, Long & Hotchkiss*, nos. 27,982, 27,991; limestone barrens near sea-level, Pointe Riche, August 4, 1910, *Fernald & Wiegand*, no. 3204 (TYPE in Gray Herb.). QUEBEC: sprawling on ledge, Ile Metchiatik, Archipel Ouapitagone, July 15, 1915, *St. John*, no. 90,841.

Var. **tonsa**, n. var., frutex depressus vel erectus ad 1 m. altus; ramulis glabris lucidis gracilibus; foliis obovatis 2.5–9 cm. longis 2–5 cm. latis glabris submembranaceis.—LABRADOR: wet land, Red Bay, August 7, 1894, *Waghorne*, no. 33 (Arnold Aboretum); springy banks and damp places, Forteau, July 30, 1910, *Fernald & Wiegand*, nos. 3213, 3214. NEWFOUNDLAND: rich thickets on lower slopes of Ha-Ha Mountain, July 17, 1925, *Fernald, Wiegand, Long, Gilbert & Hotchkiss*, nos. 27,967, 27,968; shelves, crests and talus of diorite cliffs, Ha-Ha Mountain, August 5, 1925, *Fernald & Long*, nos. 27,971 (TYPE in Gray Herb.), 27,972; wet slaty cliffs, John Kanes's Ladder, western face of Doctor Hill, August 24, 1925, *Fernald & Long*, no. 27,979. QUEBEC: schistose talus and wet shelves at base (alt. 400–600 m.) of Big Chimney, Mt. Mattaouisse, July 10, 1923, *Dodge, Griscom & Pease*, no. 25,659.

The Waghorne number from Red Bay was cited by Rydberg under *S. Waghornei* Rydb. Bull. N. Y. Bot. Gard. i. 271 (1899), but it is quite different from the type, a poor fragment, scarcely identifiable, collected by Dr. Bryant in 1860. Rydberg's description calls for a shrub with the leaves "somewhat hairy when young, but the long white hairs . . . appressed and parallel to the midrib" and the type-specimen is too near *S. cordifolia* var. *callicarpaea.*

Salix **pedunculata,** n. sp., frutex 0.5–1.5 m. altus erectus; ramulis novellis glabris fuscis deinde castaneis nitidulis; gemmis bene evolutis nondum visis; foliis immaturis membranaceis glabris ellipticis oblongis vel anguste obovatis 2–5.5 cm. longis 1–3 cm. latis subacuminatis vel plus minusve acutis, basi angustatis petiolatis petiolis 3–8 mm. longis margine subintegris vel undulato-crenatis supra viridibus sublucidisque subtus glaucis; stipulis lanceolatis 2–3 mm. longis glanduloso-dentatis deciduis; amentis foemineis coetaneis pedunculatis sub anthesi nondum visis adultioribus 4–8 cm. longis 1.1–1.4 cm. crassis densifloris; pedunculis 1–2.5 cm. longis foliis 2–3 caducis munitis pedunculo rhachique griseo-pilosis; bracteis anguste ovato-oblongis subacutis nigrescentibus 3.5–4.5 mm. longis longe pilosis; capsulis lanceolato-ovoideis longe rostratis 6–8 mm. longis breviter griseo-pilosis pilis nitidulis; stylis distinctis 1.2–1.5 mm. longis supra subclavatis stigmatibus oblongis bifidis adscendentibus stylo duplo brevioribus basi vix distinctis; pedicellis 1.5–2 mm. longis glandulam elongatam duplo superantibus.—Newfoundland: brooksides and pond-margins one mile back of Savage Cove, Straits of Belle Isle, July 14, 1925, *Fernald & Long*, no. 28,035. See p. 95.

In some characters *Salix pedunculata* suggests *S. discolor* Muhl., *S. planifolia* Pursh and *S. arctophila* Cockerell. As an erect coarse shrub with subentire to undulate glabrous leaves glaucous beneath it suggests the two former and its very long fruiting aments are suggestive of those of *S. discolor.* It is at once distinguished from both *S. discolor* and *S. planifolia* by its late flowering, the aments terminating definite and elongate leafy-bracted peduncles. The bracts (or scales) of the aments are more elongate and acute than in *S. discolor,* the style longer, and the stigmas shorter than in that species, and the capsules are shorter than in well-developed *S. discolor.* Besides by its long-peduncled instead of sessile aments *S. pedunculata* differs from *S. planifolia* in its very long fruiting aments, the longest mature aments of *S. planifolia* rarely exceeding 4 cm.; its longer pedicels and capsules and the much shorter pubescence of the latter.

In its large peduncled fruiting aments, its black scales and its

glabrous foliage, herbarium-specimens of *S. pedunculata* superficially suggest *S. arctophila*, but the latter species belongs in a very different section, with prostrate and repent habit, sessile or only short-pediceled capsules, short round-tipped bracts, etc.

The only other near relatives of *S. pedunculata* besides *S. discolor* and *S. planifolia* are *S. phylicifolia* L. of Europe, with which *S. planifolia* was formerly confused, and *S. pennata* Ball, of Washington and Oregon. From the former it is distinguished by its long peduncles and much larger fruiting aments, its longer bracts (or scales) its less deeply cleft stigmas and its longer style; from the latter, as described and illustrated by Ball, by its peduncled aments much longer in fruit, long pedicels and griseous instead of white pubescence of the capsule.

At the type-station *S. pedunculata* formed an extensive thicket at the border of a pond in the limestone barrens back of Savage Cove. It was observed only at this station but further exploration of the little known barrens along the Straits of Belle Isle will doubtless show that it, like most other species endemic in the region, extends over a considerable area.

SALIX **amoena**, n. sp., frutex 1–2 m. altus erectus; ramulis novellis glabris vel sparse pilosis glabratisque deinde castaneis nitidulis; foliis immaturis membranaceis glabris ellipticis vel anguste obovatis 4–7 cm. longis 1.3–3 cm. latis apice subacutis vel obtusis basi angustatis petiolatis, petiolis gracilibus ad 1.5 cm. longis, margine undulatis vel remote adpresso-crenatis supra viridibus subtus glaucescentibus; amentis foemineis coetaneis pedunculatis 3–7 cm. longis 1.2–1.7 cm. crassis densifloris vel basi laxifloris; pedunculis 1–3.5 cm. longis foliis 3–4 munitis pedunculo rhachique sericeo-pilosis; bracteis oblongis flavidis 2–3 mm. longis longe pilosis; capsulis lanceolato-subulatis longe rostratis 6–8 mm. longis breviter griseo-pilosis pilis nitidulis; stylis distinctis 1 mm. longis stigmatibus oblongis bifidis subadscendentibus stylo brevioribus; pedicellis 1–1.5 mm. longis glandulam elongatam paulo superantibus.—NEWFOUNDLAND: rich thickets on lower slopes of Ha-Ha Mountain, Ha-Ha Bay, July 17, 1925, *Fernald, Wiegand, Long, Gilbert & Hotchkiss*, no. 38,036 (TYPE in Gray Herb.).

In habit *Salix amoena* is very similar to *S. pedunculata* (described in this paper) but it is at once distinguished by the shorter yellow bracts of the aments, the more slender capsule, shorter style, shorter pedicels and relatively longer glands. It also simulates *S. Bebbiana*, var. *perrostrata* (Rydb.) Schneider but is quickly distinguished by the short pedicels and definite slender styles. From all forms of the protean *S. cordifolia* Pursh it stands out by its long, and in maturity,

flexuous or drooping aments, its distinctly undulate or crenate leaves (as in *S. discolor* and *S. Bebbiana*) and its slender pedicels.

In a springy meadow at the northern base of Ha-Ha Mountain it formed a thicket of considerable extent but staminate shrubs, if they there occur, were too far advanced for us to secure good male aments.

S. MYRTILLIFOLIA Anderss. Cold mossy brooksides and pond-margins one mile back of Savage Cove, *Fernald & Long*, no. 28,004; swale by Mile Brook, west of Big Brook, *Long & Gilbert*, no. 28,005; the only Newfoundland records from north of Ingornachoix Bay. See p. 95.

S. MYRYILLIFOLIA var. BRACHYPODA Fernald. Mossy brooksides and damp turfy slopes, Sacred Island, *Fernald & Long*, no. 28,006; meadow below limestone escarpment, western face of Bard Harbor Hill and dryish limestone talus, western face of Doctor Hill, Highlands of St. John, *Fernald & Long*, nos. 28,006, 28,010; the first stations except on Table Mt., Port-à-Port Bay. See p. 122. This may prove to be the problematical *S. latiuscula* Anderss. See p. 126.

S. CALCICOLA Fern. & Wieg. Dominant on wet or dry limestone barrens from Pistolet Bay to Ingornachoix Bay. See p. 62. Very variable, the mature foliage varying from elliptic-lanceolate to sub-orbicular and from 0.8–5.6 cm. long.

S. CRYPTODONTA Fern. Cold brooksides and pond-margins one mile back of Savage Cove, *Fernald & Long*, no. 28,026; cold springy glade, interior of southern half of Burnt Cape, *Fernald & Long*, no. 28,028; the first stations except the original, on the East Branch of the Humber. See pp. 95, 119.

S. BEBBIANA Sargent, var. PERROSTRATA (Rydb.) Schneider. Thickets, brooksides and damp calcareous slopes along the Straits, local: Big Brook, *Fernald, Wiegand & Hotchkiss*, no. 28,032; Eddies Cove Brook, Griscom, no. 28,038; Savage Cove, *Fernald & Long*, no. 28,033; the Rocky Mt. extreme, new to Newfoundland. See p. 95.

S. PLANIFOLIA Pursh. Schneider[1] excludes this species from the flora of Newfoundland. It abounds in northwestern Newfoundland from Quirpon to St. John Bay.

S. PELLITA Anderss. Brookside below John Kanes's Ladder, western face of Doctor Hill and meadow below calcareous sandstone escarpments, western face of Bard Harbor Hill, Highlands of St. John, *Fernald & Long*, nos. 28,057, 28,058; the only Newfoundland records from north of the Humber.

BETULA PUMILA L., var. **renifolia**, n. var., frutex depressus; ramulis villosis; foliis ramulorum fructiferorum plerumque reniformibus vel oblatis basi cordatis margine grosse dentatis.— QUEBEC: gneiss

[1] Journ. Arn. Arb. iii. 89 (1921).

ledges, Mutton Bay, Saguenay County, September 7, 1925, *Fernald & Long*, no. 28,089 (TYPE in Gray Herb.); Bonne Espérance, August 27, 1882, *J. A. Allen*, no. 70 (in part).

In typical *Betula pumila*, which abounds in Newfoundland, southern Labrador and much of eastern Canada, the principal leaves of the fertile branches are obovate and narrowed to the base. At Mutton Bay, var. *renifolia* was a dominant shrub, covering the ledges over a considerable area. No typical *B. pumila* was observed there, although our visit was brief—during the short stop of the steamer.

URTICA GRACILIS AND SOME RELATED NORTH AMERICAN SPECIES.—There are three indigenous Nettles in the region from New England to Newfoundland and Labrador. One of them has regularly passed as *Urtica gracilis* Ait., another as *U. Lyallii* Wats., and the third has been doubtfully referred sometimes to one, sometimes to the other of those species. In attempting to clear the identity of the third plant it has become obvious that we have always misidentified *U. gracilis* and that the wide-ranging boreal species (extending from Newfoundland to British Columbia, south to northern and western New England, northern New York, New Mexico and Oregon) which we have called *U. Lyallii* is not satisfactorily identifiable with the Lyall plant which Watson had before him. And not merely the type of *U. Lyallii* Wats. has been misunderstood, but the identity of his other species, *U. Breweri* of California, has been wholly misinterpreted. There are few good diagnostic characters to be found in the flowers and fruits of our perennial nettles, all of which were treated by Weddell[1] as varieties of the Old World *U. dioica* L. *U. dioica* is, as its name implies, dioecious; the native American plants strongly tend to be monoecious. In the latter series wholly pistillate individuals frequently occur but in the whole range of native American plants studied I have found no specimens which have only staminate inflorescences; various mixtures occur but all American plants apparently have some of the terminal racemes pistillate. On this account and since the American plants have clearly defined and wholly characteristic and consistent ranges, I am treating them as species, although it is not possible to assign them diagnostic fruit-characters. A large proportion of specimens are so poorly collected (for obvious reasons) that the best diagnostic character, the mature stipule, is

[1] Weddell, Mon. Urt. 78 (1856) and in DC. Prodr. xvi.[1] 50–53 (1869).

not well displayed. The texture and shape of the mature stipules, a character already used by Rydberg in his *Flora of the Rocky Mountains*, is probably as important a character as any. In the eastern and transcontinental plants the stipules are scarious to herbaceous in texture and green to at most pale-brown; in the three species confined to the Pacific slope, *U. holosericea* Nutt., *U. Breweri* Wats. (? *U. californica* Greene) and *U. Lyallii* Wats., they are subcoriaceous to coriaceous and soon become deep-brown to castaneous. As a result of the present study the following memoranda on the principal perennial species of temperate North America are recorded.

URTICA GRACILIS Ait. Hort. Kew. iii. 341 (1789). As usually interpreted, *U. gracilis* is the tall species of the eastern United States with the stems only slightly, if at all bristly, except at base, but cinereous-pilose above; the primary leaves ordinarily oblong-lanceolate or narrowly ovate-lanceolate, with 20–35 teeth on each margin—those subtending the lowest inflorescences with 19–38 (av. 25); the petiole $\frac{1}{5}$–$\frac{3}{5}$ as long as the blade; the lower leaf-surfaces ashy-puberulent and the stipules densely cinereous-puberulent. This plant is of wide range in the United States, westward across the Mississippi Basin; and, so far as shown in the Gray Herbarium, its northeastern limit extends from the warm southern side of the Gulf of St. Lawrence (Nova Scotia and Prince Edward Island—lat. 46°–47°) across southern Aroostook County, Maine (lat. 46° 40′) to the region slightly north of Montreal (lat. 46° 20′) and the counties of Ontario bordering Lake Ontario (lat. 44°).

When Aiton's original description is studied some points are apparent which at once indicate that we have been in error in applying to the plant just defined the name *U. gracilis*. Aiton's description was brief but clear:

"6. U. foliis oppositis ovato-lanceolatis nudiusculis, caule petiolisque hispidis, racemis geminis.
Slender-stalk'd Nettle.
Nat. of Hudson's Bay.
Introd. 1782, by the Hudson's Bay Company."

The description alone might be given little weight, were it not for the type region, Hudson Bay, hundreds of miles to the north of the known northern limit of the tall species with puberulent closely toothed leaves and cinereous stipules. But in view of the occurrence in northwestern Newfoundland and on the Labrador Peninsula, thence westward to British Columbia, and south to the Magdalen

Islands, northern and western New England, northern New York, New Mexico and Oregon, of a plant with ovate-lanceolate usually glabrous slender-petioled leaves with the upper half of the stem and the petioles often bristly, it seems clear that it is this more northern species which should bear the name *U. gracilis*. The more boreal plant has the stems glabrous or merely setulose above; the leaves lanceolate to ovate, glabrous or only sparingly pilose beneath; their margins more coarsely toothed than in the more southern species—each side of the leaves subtending the lowest inflorescences having 13–23 (av. 17) teeth; the petiole slender and elongate, 1.5–5.5 (av. 3) cm. long, $\frac{1}{5}$–$\frac{3}{5}$ as long as the blade; and the very thin stipules often nearly glabrous. This is the plant which in eastern America has passed as *U. Lyallii* Wats., but the Lyall plant, as already noted, is a species of the north Pacific slope with firm and finally castaneous stipules.

With *U. gracilis* now identified as the northern transcontinental long-petioled species, the "Slender-stalk'd Nettle" of Aiton which has erroneously passed as *U. Lyallii*, it is necessary to find the correct name for the more southern plant with cinereous puberulence which has passed as *U. gracilis*. This seems to be, without question, *U. procera* Muhl. in Willd. Sp. Pl. iv.[1] 353 (1805).

The third indigenous species of northeastern America is with us a plant of the coast, chiefly at the upper borders of beaches, occurring from southeastern Labrador to Maine but reappearing in the Rocky Mountains, from Alberta to New Mexico. It is a lower but coarser plant than either *Urtica gracilis* or *U. procera*, its leaves with glabrous to pilose-hirsute lower surfaces, coarse teeth and short, stout petioles; the leaves subtending the lowest inflorescences having 11–25 (av. 17) pairs of teeth and petioles 0.7–2.5 (av. 1.3) cm. long, only $\frac{1}{8}$–$\frac{1}{4}$ as long as the leaf-blade. Its staminate inflorescences are short and thick and its stipules comparatively long. This short-petioled species was described from the Rocky Mountains as *U. viridis* Rydb. Bull. Torr. Bot. Cl. xxxix. 305 (1912).

Since these three species have all passed as *Urtica gracilis* it is well to reenumerate their diagnostic characters and to cite some characteristic specimens.

U. GRACILIS Ait. Hort. Kew. iii. 341 (1789). *U. cardiophylla* Rydb. Bull. Torr. Bot. Cl. xxiv. 191 (1897). *U. Lyallii* of eastern Am. authors, not Wats.—Slender, 0.3–1 m. high: stem glabrous above or somewhat setulose and sparingly pilose: leaves lanceolate

to ovate, rounded to cordate at base, slender-petioled, glabrous on both surfaces or sparingly pilose beneath, coarsely serrate; those subtending the lowest inflorescences 5–15 (av. 9) cm. long, with 13–23 (av. 17) pairs of teeth and with petioles 1.5–5.5 (av. 3) cm. long and $\frac{1}{5}$–$\frac{3}{5}$ as long as the blade: stipules thin, greenish to straminеous, glabrous to pilose, much shorter than the petioles: inflorescences slender, usually forking, mostly moniliform or interrupted.—Northwestern Newfoundland to northern Maine, western New England and northern New York; Alberta and British Columbia, south to New Mexico and Oregon. The following are characteristic. NEWFOUNDLAND: rich thickets and glades near timber-line, Bard Harbor Hill, Highlands of St. John, *Fernald, Wiegand, Long, Gilbert & Hotchkiss*, no. 28,099; springy cliffs and talus above the Overfall of Deer Pond Brook, Highlands of St. John, *Wiegand, Gilbert & Hotchkiss*, no. 28,103; bushy swale on flat north of Doctor Hill, St. John Bay, *Fernald & Wiegand*, no. 28,104. QUEBEC: Seven Islands, Saguenay Co., *C. B. Robinson*, no. 946; thicket, Dartmouth River, Gaspé Co., *Collins, Fernald & Pease*, no. 5503; limestone detritus in thickets, Les Murailles, Percé, *Fernald & Collins*, no. 1003; calcareous sea-cliffs and rock-slides by the Gulf of St. Lawrence, slightly west of Marten River, Gaspé Co., *Fernald & Pease*, no. 25,029; thickets and wet rock-talus, Nettle Gully, alt. about 400 m., northern base of Mt. Collins, *Fernald & Pease*, no. 25,038 (locality given on label as "Mt. Logan"), *Fernald & Smith*, no. 25,712; Tadousac, August 9, 1892, *G. G. Kennedy*. MAGDALEN ISLANDS: cool wooded bank, Grindstone Island, *Fernald, Long & St. John*, no. 7321; open spruce woods, Basin Island, *Fernald, Bartram, Long & St. John*, no. 7319; sandy bank, Amherst Island, *St. John*, no. 1850. PRINCE EDWARD ISLAND: by brook in woods, Harmony, *Fernald & St. John*, no. 11,033. MAINE: Fort Kent, 1881, *Kate Furbish;* alluvial island, Seven Islands, St. John River, *St. John*, no. 2278. VERMONT: Burlington, August 16, 1901, *L. R. Jones* (probably introduced); Wallingford, May 25, 1908, *E. F. Williams* (probably introduced). CONNECTICUT: roadside, Stafford, August 27, 1903, *Bissell, Graves* (probably introduced). NEW YORK: roadsides, Potsdam, *Phelps*, no. 385 (probably introduced). MONTANA: banks of Missouri River, alt. 3600 ft., *Scribner*, no. 251; Bald Mountain, alt. 7000 ft., *Watson*, no. 357 (distributed as *U. Breweri*). WYOMING: Centennial Valley, *A. Nelson*, nos. 1273, 1862 (as *U. Breweri*). COLORADO: Bob Creek, western La Plata Mts., *Baker, Earle & Tracey*, no. 282; near Pagosa Peak, alt. 9000 ft., *Baker*, no. 281, North Elk Canyon, Rio Blanco Co., July 26, 1902, *Sturgis*. NEW MEXICO: bottom of Moro River, *Fendler*, no. 821; White Mts., alt. 7000 ft., *Wooton*, no. 305; Windsor Creek, alt. 8400 ft., Pecos River National Park, *Standley*, no. 4259. IDAHO: river-bank, St. Anthony, *Merrill & Wilcox*, no. 853. OREGON: mountain streams and bogs, alt. 4000–6000 ft., *Cusick*, no. 2070. WASHINGTON: Columbia River, Klikitat Co., *Suksdorf*, no. 58; near

Ellensburgh, *Brandegee*, no. 1075; low meadows, Pullman, July 10, 1895, *Hardwick, Piper;* along streams in woods, Blue Mts., July 17, 1896, *Piper;* near streams, Waitsburg, *Horner*, no. B443; Montesano, *Heller*, no. 3920; among bushes along streams, Mt. Paddo, *Suksdorf*, no. 6354. British Columbia: Upper Alloknejik Lake, July, 1882, *McKay;* thickets, Beaver Creek, Selkirk Range, July 13, 1885, *Macoun;* deep thicket at Nelson, *Shaw*, no. 667; thickets, Yoho Valley, July 28, 1916, *Hunnewell.*

U. procera Muhl. in Willd. Sp. Pl. iv. 353 (1805). *U. gracilis* of most Am. auth., not Ait. *U. dioica*, v. *procera* (Muhl.) Weddell, Mon. Urt. 78 (1856). *U. longifolia* Raf. acc. to Weddell, l. c. (1856). —Slender and tall, up to 1 m. or more high: stem only slightly if at all bristly but cinereous-pilose or -puberulent toward the summit: leaves oblong-lanceolate to narrowly ovate-lanceolate, usually cinereous-puberulent beneath, slender-petioled, rather closely serrate; those subtending the lowest inflorescences 6.5–18 (av. 11) cm. long, with 19–38 (av. 25) pairs of teeth and with petioles 1.5–8.5 (av. 4.5) cm. long and $\frac{1}{5}$–$\frac{3}{5}$ as long as the blade: stipules submembranaceous, cinereous-puberulent, much shorter than the petioles.—Nova Scotia and southern Quebec to North Dakota, south to North Carolina and Louisiana. The following are characteristic. Quebec: roadside, Lac Mercier to Lac Tremblant, Terrebonne Co., July 29, 1922, *Churchill;* très abondant sur la terre noire de St. Hubert, *Victorin*, no. 17,441; dry pasture, Philipsburg, August, 1923, *Knowlton.* Prince Edward Island: swampy woods and thickets along Brackley Point Road, *Fernald, Long & St. John*, no. 7320. Nova Scotia: open woods about bases of gypsum cliffs, Port Bevis, *Fernald & Long*, no. 21,037; damp thickets near Tusket River, Tusket Falls, *Fernald, Bissell, Graves, Long & Linder*, no. 21,036; rocky roadside, Belleville, *Fernald & Long*, no. 23,786. Maine: moist roadside, Limestone, *Cushman*, no. 2265; river-thicket, Masardis, September 8, 1897, *Fernald;* Fort Fairfield, July 19, 1902, *Williams, Collins & Fernald;* thicket, Bradley, July 17, 1890, *Fernald;* Buckfield, September, 1889, *Parlin;* moist roadside-thickets, Monhegan Island, *Jenney, Churchill & Hill*, no. 3231; river-shore, Topsham, August 29, 1912, *Kate Furbish;* roadside clearing, Baldwin, *Fernald, Long & Norton*, no. 13,511; Kittery Point, August 27, 1895, *E. F. Williams.* New Hampshire: wet roadside, Colebrook, *Pease*, no. 10,904; shaded street, Jefferson, *Pease*, no. 16,704; open roadside, Hillsborough, September 11, 1920, *C. F. Batchelder;* thicket, edge of rich heavy woods, Walpole, August 21, 1916, *Batchelder;* near dwellings, Jaffrey, *Robinson*, no. 297. Vermont: Middlebury, August 7, 1883, *Brainerd;* Weybridge, July 8, 1908, *E. F. Williams;* roadside spring, Wallingford, July 23, 1907, *Kennedy;* Manchester, *Day*, no. 156. Massachusetts: brackish ground, Newburyport, *D. White*, no. 421; farm-yard, Concord, September 27, 1896, *Williams;* near outlet of Spot Pond, Middlesex Fells, August 19, 1920, *Kidder;* Needham,

August 1, 1886, *T. O. Fuller;* North Scituate, August 15, 1901, *Kennedy;* thickets along roadside, Barnstable, *Fernald & Long*, no. 16,724; open grassy roadsides, West Chesterfield, *Robinson*, no. 493; low ground, Monterey, July 7, 1920, *Hoffmann;* alluvium, Lanesboro, July 20, 1915, *Churchill.* RHODE ISLAND: Rumford, September 6, 1903, *Williams;* Wickford, June 17, 1908, *Kennedy.* CONNECTICUT: sandy bank, Thompson, June 10, 1922, *Bill & Grigg;* roadside, Southington, *Bissell*, no. 533; dry thicket, North Guilford, August 19, 1906, *G. H. Bartlett;* roadside waste, Newton, September 26, 1901, *Eames.* NEW YORK: western New York, *Sartwell.* PENNSYLVANIA: shore of Delaware River, Morrisville, *Bartram*, no. 1298. KENTUCKY: Lexington, *Short.* ONTARIO: woods, Hay Island, Gananoque, July 20, 1908, *Kennedy;* Plevna, August 5, 1902, *Fowler;* Belleville, *Macoun*, no. 1584. MICHIGAN: under scattered hardwood, Turin, Marquette Co., July 30, 1901, *Barlow;* Grand Rapids, September 29, 1860, *Wm. Boott.* ILLINOIS: Mahomet, *Gleason*, no. 75; Bloomington, August, 1886, *Robinson.* MINNESOTA: Lake Kilpatrick, Cass Co., July, 1893, *Ballard.* NEBRASKA: Keyapaha Co., *Clements*, no. 2910; woods near Plummer Ford, Dismal River, *Rydberg*, no. 1520. NORTH DAKOTA: prairies, Leeds, July 31, 1896, *Lunell;* black alluvial loam, near Fargo, August 23, 1901, *Waldron & Manns.* KANSAS: bank of Joy Creek, Osborne Co., *Shear*, no. 201.

U. VIRIDIS Rydb. Bull. Torr. Bot. Cl. xxxix. 305 (1912).—Stouter than *U. gracilis*, 2–8 dm. high: stem glabrous, or pilose above: primary leaves lanceolate to narrowly ovate, firm, rounded at base, short-petioled, glabrous on both surfaces or pilose-hirsute beneath, coarsely serrate; those subtending the lowest inflorescences 3.5–10 (av. 7) cm. long, with 11–25 (av. 17) pairs of coarse teeth and with petioles 0.7–2.5 (av. 1.3) cm. long and $\frac{1}{8}$–$\frac{1}{4}$ as long as the blade: stipules lanceolate, with glabrous scarious margins, from one-half as long to longer than the petioles: inflorescences dense and thick; the staminate commonly 3–6 mm. thick.—Straits of Belle Isle, Labrador southward along the coast to Lincoln Co., Maine; Alberta to South Dakota and New Mexico. The following are characteristic. LABRADOR: springy banks and damp hillsides, Forteau, *Fernald & Wiegand*, no. 3279; sand-bank bordering beach, Forteau, *Long*, no. 28,101; abundant by streams on the calcareous sandstone terraces, Blanc Sablon, *Fernald & Wiegand*, no. 3280. NEWFOUNDLAND: turfy barrens and slopes, Sacred Island, *Wiegand, Gilbert & Hotchkiss*, no. 28,100; rich thickets on lower slope of Ha-Ha Mountain, *Fernald, Wiegand, Long, Gilbert & Hotchkiss*, no. 28,097; limestone shingle and gravel along shore, Flower Cove, *Fernald, Long & Dunbar*, no. 26,604; damp thickets, Bear Cove, *Wiegand & Pease*, no. 28,098; turfy limestone shore, St. Barbe, *Fernald, Long & Dunbar*, no. 26,605; sandy shore back of Cow Head, *Fernald & Wiegand*, no. 3278; woods, Lark Harbor, *Waghorne*, no. 29; door-yard, near Frenchman's Cove, *Mackenzie & Griscom*, no. 10,247. QUEBEC: rocky shore, Piashtibaie,

St. John, no. 90,396; sur le rivage calcaire, Ile Herbée, Mingan, *Victorin & Rolland*, no. 18,570; autour des habitations, Pointe-aux-Esquimaux, *Victorin & Rolland*, no. 18,497; abondant sur les rivages, Ilets de la Baie à Jean, *Victorin & Rolland*, no. 18,408; Baie Sainte-Claire, Anticosti, *Victorin*, no. 4197; sur les rivages calcaires, Baie du Renard, Anticosti, *Victorin, Rolland & Louis*, no. 22,053. MAGDALEN ISLANDS: Ile du Hâvre-au-Ber, *Victorin & Rolland*, no. 9627. NEW BRUNSWICK: clearings, Bathurst, *Blake*, no. 5434. MAINE: Machias Seal Island, July 27, 1902, *Mrs. A. H. Norton*; waste ground, Seal Harbor, August 30, 1889, *Redfield;* beach, Great Cranberry Isle, August 20, 1888, *Rand;* south and east shores of Little Cranberry Isle, August 6, 1889, *Redfield;* sandy ridge back of beach, Flye's Island, Brooklin, *Hill*, no. 586; barrier beach, Atlantic, Swans Island, *Hill*, no. 1552; old cellar-hole, Outer Heron Island, Boothbay, *Fassett*, no. 804. NORTH DAKOTA: damp canyons, Deadwood, *Carr*, no. 143. ALBERTA: Rocky Mountains, 1858, *Bourgeau* (cited by Rydberg); Red Deer River, *Macoun*, nos. 200, 1584; thickets, Red Deer Valley, vicinity of Rosedale, *Moodie*, no. 1094; MONTANA: Emigrant Gulch, *Rydberg & Bessey*, no. 3935 (TYPE no.). WYOMING: along the creek, creek bottoms, Halleck Cañon, *A. Nelson*, no. 7444 (cited by Rydberg); Merican Mines, *A. Nelson*, no. 590. COLORADO: Gunnison, *Baker*, no. 601; low wet bottoms, Mancos, *Baker, Earle & Tracy*, no. 40. NEW MEXICO: *Parry*, 1867, no. 196.

Urtica viridis is the North American counterpart of the Asiatic *U. angustifolia* Fisch. In its short-petioled narrow leaves with coarse teeth and often quite glabrous surfaces it exactly matches sheets of the latter from Siberia, Mandchuria and Afghanistan, but all the Asiatic specimens agree with the descriptions in being strictly dioecious, like the Old World *U. dioica*, while *U. viridis* is nearly always definitely monoecious. It is probable that some references to *U. angustifolia* in America belong to *U. viridis*.

As stated in the introductory paragraph Watson's species, *Urtica Lyallii* and *U. Breweri* have both been misinterpreted.

U. Lyallii Wats. Proc. Am. Acad. x. 348 (1875) was primarily "A very large leaved species collected by Dr. Lyall in the Cascade Mts. in lat. 49°" but "more densely hispid" specimens were also cited from Marin Co., California, collected by Bolander and Kellogg ("H. N. BOLANDER, KELLOCK, M. D. & CO." on the label) and a slender plant collected by Lyall on Vancouver Island was cited as "probably the same." The first-cited plant, which was collected by Lyall and which formed the chief basis of the species must be taken as type. This and the Lyall material from Vancouver Island are fortunately conspecific and represent the glabrous or but slightly

pubescent species of Alaska, British Columbia, Washington and Oregon, with slender petioles, ovate, often cordate thin leaves and firm brownish, often finally castaneous stipules. The plant from Marin County is a specimen of the much coarser and more southern *U. Breweri* Wats. (? *U. californica* Greene). *U. Breweri* Wats. l. c. (1875) was based primarily on Brewer's no. 95 from Los Angeles, but specimens collected by Bigelow in western Texas and by Wolf in southern Colorado were also cited. The Brewer plant from Los Angeles, the type of the species, is not at all like the Bigelow and Wolf specimens. The two latter are very characteristic specimens of the *annual* species, *U. gracilenta* Greene. In fact, Watson himself, after originally calling these *U. Breweri*, penciled on the sheet containing them: "Probably distinct species. Lvs. large, thin, coarsely toothed, *few-nerved*, long-petioled. Stupiles *herbaceous*, linear-lanceolate. Calyx villose." Nevertheless, on a sheet of the original material of *U. gracilenta* sent by Greene he penciled " = *U. Breweri*, Watson." The type of *U. Breweri* (Brewer's no. 95 from Los Angeles) consists of two fragments picked obviously late in the season from a large almost woody stem. There are no primary leaves, only those of secondary shoots, but their characteristic pubescence and their firm brown stipules show them to belong apparently to the very characteristic coarse species of the coast of California farther north, afterward described as *U. californica* Greene, Pittonia, i. 281 (1889). The Marin County plant included by Watson under *U. Lyallii* also belongs here (a good match for authentic *U. californica*). Dr. I. M. Johnston informs me that the uncharacteristic fragments which formed the type of *U. Breweri* have not been matched by recent collections from Los Angeles and that the Brewer material might have been collected nearer San Francisco and erroneously labeled.

The widely distributed plant which generally passes as *Urtica Breweri* is quite distinct and no material of it was included by Watson in his original account. As usually incorrectly interpreted, *U. Breweri* is identified as a tall cinereous-puberulent plant with the coarsely toothed narrow leaves velvety-puberulent beneath, and with the lanceolate puberulent stipules drab or greenish, occurring from Idaho and Washington southward through California, Arizona and New Mexico into Mexico. The plant is the western representative of *U. procera* but it seems to be a reasonably distinct species. Its correct name seems to be

U. SERRA Blume, Mus. Bot. Lugd.-Bat. ii. 140 (Nov., 1855). *U. dioica*, β. *angustifolia* Schlecht. Linnaea, vii. 141 (1832), not *U. angustifolia* Fisch. (1819). *U. aquatica* Liebm. K. Dansk. Vidensk. Selsk. Skrift. ser. 5, ii. 291 (1851), not Moon (1824). *U. mexicana* Blume, l. c. (1855), not Liebm. (1851). *U. dioica*, var. *occidentalis* Watson, Bot. U. S. Geol. Expl. Fortieth Par. 321 (1871).

Blume's species, *U. serra* and *U. mexicana*, and the other species (including *Lythraceae*) published at the same time are usually cited as dating from 1852. The latter date appeared on No. 1 of vol. ii. of the *Museum Botanicum*, but in Bot. Zeit. xiv. 186 (1856) Miquel showed that Nos. 1–8 of vol. ii. were not put on sale until 1856; and he later indicated (p. 540) that the four numbers, 9–12, were published respectively in November and December, 1855, and January and February, 1856.

COMANDRA RICHARDSIANA Fernald. Dominant on turfy or peaty knolls in the limestone barrens from Pistolet Bay to St. John Bay. See p. 91. Previously known in Newfoundland only from Mackenzie & Griscom's collection from the Bay of Islands.

OXYRIA DIGYNA (L.) Hill. Wet quartzite rocks and gravel along brook, Southwest Gulch, Highlands of St. John, *Fernald, Wiegand, Long, Gilbert & Hotchkiss*, no. 28,115, the first station in Newfoundland since La Pylaie's discovery of it on Grois Island. See p. 124.

RUMEX OCCIDENTALIS Wats. The only indigenous dock of northwestern Newfoundland, frequent in swales or on peaty or turfy shores from Pistolet Bay to St. John Bay. See pp. 54, 118.

SALICORNIA EUROPAEA L., var. PROSTRATA (Pall.) Fern. Damp depressions in sand and gravel back of barrier beach, Argentia, *Fernald, Long & Dunbar*, no. 26,644; the first in Newfoundland except from Bay St. George and Port-à-Port Bay. See p. 86.

SUAEDA RICHII Fernald. Damp depressions in sand and gravel back of barrier beach, Argentia, *Fernald, Long & Dunbar*, no. 26,645, the first fruiting material from Newfoundland. Records of young plants from Bay St. George and Notre Dame Bay probably belong here. See p. 86.

ARENARIA DAWSONENSIS Britton (*A. litorea* Fernald). Depressions of limestone barrens along the Straits, widely distributed but rather local; previously unknown from north of Bay of Islands and Notre Dame Bay. See p. 62.

A. CYLINDROCARPA Fernald. Widely distributed in clay and gravel of the limestone barrens from Pistolet Bay to Port-à-Port Bay. See p. 79.

STELLARIA FLORIDA Fischer. Springy swale and turfy upper border of strand, Anse aux Sauvages, Pistolet Bay, *Fernald, Wiegand & Long*, nos. 28,196, 28,197; a Kamtchatkan species collected for the first time in America in 1923 on Tabletop Mts., Gaspé. See p. 123.

CERASTIUM ALPINUM L. The typical form of the species was seen only once: mossy brooksides and damp turfy slopes, Sacred Island, *Fernald & Long*, no. 28,208, probably new to Newfoundland.

C. ALPINUM, var. GLANDULIFERUM Koch. Dry limestone barrens, northern half of Burnt Cape, *Fernald, Wiegand, Pease, Long, Griscom, Gilbert & Hotchkiss*, no. 28,204, new to Newfoundland.

C. ALPINUM, var. LANATUM (Lam.) Hegetschw. Common on turfy or gravelly slopes or on cliffs from Quirpon westward to Four-Mile Cove. See pp. 54, 98.

C. REGELII Ostenf. Limestone ledges on the west side of Schooner (Brandy) Island, Pistolet Bay, *Pease & Long*, no. 28,212. See p. 106. An arctic Eurasian species heretofore known in America only from Cape Nome, Alaska (*Blaisdell*), the material of the latter collection identified by Dr. Ostenfeld.

C. CERASTIOIDES (L.) Britton. Wet mossy rocks and gravel along brook, Southwest Gulch, Highlands of St. John, *Fernald, Wiegand, Long, Gilbert & Hotchkiss*, no. 28,231, the only known station, except Tabletop Mts., Gaspé, south of northern Labrador. See p. 124. Only a single over-ripe specimen was noticed, snatched at the last moment after the order to quit had been given. It was on gravel at the forks of the Gulch and had presumably washed down from higher up.

C. viscosum L. Turfy roadside, Burgeo, *Fernald, Long & Dunbar*, no. 26,678, an obvious adventive, new to Newfoundland.

RANUNCULUS HYPERBOREUS Rottb. Brooksides and springy calcareous meadows, Savage Cove, *Fernald, Long & Dunbar*, no. 26,686, *Fernald & Griscom*, no. 28,251; dried-out shallow pools in limestone barrens, Sandy (Poverty) Cove, *Fernald, Long & Gilbert*, no. 28,252; swaley margin of pool in limestone barrens, Capstan Point, Flower Cove, *Fernald, Long & Dunbar*, no. 26,685; shallow water of old beaver pond near the Yellow Marsh, back of Bard Harbor, St. John Bay, *Gilbert & Hotchkiss*, no. 28,253. See pp. 61, 127. New to Newfoundland, the old records having been based on either *R. Cymbalaria* Pursh or *R. hederaceus* L.

R. PEDATIFIDUS J. E. Sm., var. LEIOCARPUS (Trautv.) Fern. (*R. affinis* R. Br.). Turfy or gravelly shelves, crests and talus of diorite cliffs, Ha-Ha Mountain, *Pease & Griscom*, no. 28,258, *Fernald & Long*, no. 28,259; mossy and turfy trap cliffs and talus, Anse aux Sauvages, Pistolet Bay, *Fernald, Wiegand & Long*, no. 28,260; the first stations south of the Torngat region of Labrador. See pp. 104, 123, also pl. 153, fig. 3.

R. PENSYLVANICUS L. f. Boggy meadows and clearings, back of Bard Harbor, St. John Bay, very scarce, *Wiegand, Gilbert & Hotchkiss*, no. 28,266, the first authentic station except from the lower Exploits.

R. MACOUNII Britton. Brookside in bushy swale on flat north of Doctor Hill, St. John Bay, no. 28,267, the first from north of Hawke Harbour. See p. 127.

ANEMONE MULTIFIDA Poir. var. HUDSONIANA DC. Dry limestone cliffs and talus, western face of Doctor Hill, Highlands of St. John, *Fernald & Long*, no. 28,278, our only station except on the lower Exploits and Notre Dame Bay. See p. 126.

BARBAREA ORTHOCERAS Ledeb. Peaty borders of spruce thickets, Savage Cove, *Fernald & Griscom*, no. 28,317; brooksides and slaty hills, Little Quirpon, *Wiegand, Gilbert & Hotchkiss*, no. 28,318, *Fernald & Gilbert*, no. 28,319, *Wiegand & Hotchkiss*, no. 28,320; our first stations outside the Exploits Valley. See p. 121.

CARDAMINE PRATENSIS L., var. ANGUSTIFOLIA Hook. Dominant in peat and damp turf on the limestone barrens from Pistolet Bay westward to Deadman Cove, the first area known south of northern Labrador. See p. 91.

LESQUERELLA ARCTICA (Wormskj.) Wats. Dry gravelly limestone barrens, Burnt Cape to Big Brook; St. John's Island; previously known from Table Mt., Port-à-Port Bay and Cape St. George. See pp. 100, 103, 118.

L. arctica, var. *Purshii* Wats., seems to have no characters of value.

DRABA NIVALIS Lilj. Gravelly shelves, crests and talus of Ha-Ha Mountain, *Pease & Griscom*, no. 28,342; crevices of trap cliffs, Anse aux Sauvages, Pistolet Bay, *Fernald, Wiegand & Long*, no. 28,347; open peaty and gravelly spots on crests of trap cliffs, Cape Onion, *Fernald & Long*, no. 28,346; dry slaty crests of hills, Little Quirpon, *Fernald & Long*, no. 28,343; rocky crests of Cape Dégrat, Quirpon Island, *Fernald & Long*, no. 28,344; new to Newfoundland. See pp. 104, 121, 123.

DRABA INCANA L. Typical *D. incana* with glabrous fruit is rare on the Straits: gravelly limestone shore, Cape Norman, *Wiegand, Griscom & Hotchkiss*, no. 28,348.

D. INCANA, var. CONFUSA (Ehrh.) Poir. Abundant on peaty and turfy calcareous slopes and shores from Pistolet Bay to Cow Head. See pp. 60, 90.

D. MEGASPERMA Fern. & Knowlt. Peaty and gravelly limestone shores from Quirpon to Brig Bay. See pp. 53, 90.

D. ARABISANS Michx. Limestone cliffs and talus, western escarpments of Bard Harbor Hill and Doctor Hill, Highlands of St. John; only stations north of Bay of Islands. See p. 117.

D. PYCNOSPERMA Fern. & Knowlt. Dry limestone cliffs and talus, western face of Doctor Hill, Highlands of St. John, *Fernald & Long*, no. 28,369; heretofore known only from the type region, Percé, Gaspé Co., Quebec. See. p. 125.

D. HIRTA L. Dominant on calcareous areas, northwestern Newfoundland. See p. 90.

D. RUPESTRIS R. Br. Dominant on calcareous areas, northwestern Newfoundland. See pp. 60, 90.

ARABIS DRUMMONDI Gray. Meadow below limestone escarpment, western face of Bard Harbor Hill, *Fernald & Long*, no. 28,422; only known Newfoundland station except along lower Exploits. See p. 124.

A. DRUMMONDI, var. CONNEXA (Greene) Fernald. Mossy and turfy trap cliffs and talus, Anse aux Sauvages, Pistolet Bay, *Fernald, Wiegand & Long*, no. 28,421; dryish limestone talus, western face of Doctor Hill, *Fernald & Long*, no. 28,420; new to Newfoundland. See p. 123.

BRAYA **Longii**, n. sp., planta perennis humilis plerumque multiceps; radice crassa longe descendenti; caulibus adscendentibus saepe purpurascentibus 1–10 cm. longis rare fructiferis usque ad 15 cm. longis nudis vel sub racemo monophyllis, pilis simplicibus bifurcatisque inaequilongis griseis sparse obsitis; foliis rosulatis carnulosis linearioblanceolatis obtusis 1–4 cm. longis 1–3 mm. latis integris glabris vel basi dilatato apiceque sparse ciliatis; racemo sub anthesi dense corymboso, fructifero plus minusve elongato 1–7 cm. longo 3–20-floro, fructibus contiguis vel infimis 1–2 distantibus; pedicellis crassis 1–4.5 mm. longis fructiferis arcte adscendentibus; sepalis deciduis plerumque viridibus rare purpurascentibus glabris 2–3 mm. longis oblongis vel ellipticis apice rotundatis margine hyalinis; petalis 4–5.5 mm. longis late obovatis albis tandem basin versus violaceis; staminibus 2–3 mm. longis; antheris 0.4–0.6 mm. longis; pistillo lanceolato glabro, ovario ovulis 10–16, stylo crasso cylindrico, stigmate depresso stylo latiore bilobato; siliquis lanceolato-subulatis 4–9 mm. longis 1–2 mm. latis stylo crasso 0.4–0.8 mm. longo coronatis, valvis glabris, septo albo uninervo vel enervo; seminibus oblongo-ovatis brunneis 1.2–1.5 mm. longis 0.5–0.8 mm. latis.—Shores of the Straits of Belle Isle, northwestern NEWFOUNDLAND: turfy or peaty pockets in limestone ledges, Sandy (or Poverty) Cove, August 1, 1924, *Fernald, Long & Dunbar*, no. 26,723 (distributed as *B. purpurascens*); among loose rocks, limestone barrens, Sandy Cove, July 12, 1925, *Fernald & Griscom*, no. 28,423; gravelly and peaty limestone barrens, Sandy Cove, July 25, 1925, *Fernald, Long & Gilbert*, no. 28,424 (TYPE, in Gray Herb.); dry gravelly limestone barren, Savage Point, July 13, 1925, *Fernald, Wiegand, Pease, Long, Gilbert & Hotchkiss*, no. 28,425; dry gravelly and turfy limestone barrens, Savage Point, August 29, 1925, *Fernald & Long*, no. 28,426; crevices of limestone barrens, Yankee Point, August 16, 1925, *Fernald, Wiegand & Long*, no. 28,427.

A beautiful species, originally detected by my companion on many hard trips, Bayard Long, to whose keenness in the field we owe many of the most interesting discoveries of the recent Newfoundland trips. *B. Longii* superficially resembles *B. purpurascens* (R. Br.) Bunge of the Arctic, with which the first collection was placed. It differs, however, in its narrower basal leaves; sparser but more often forking

pubescence of the stems; longer and broader petals; glabrous (not pilose) ovary and silique, the latter lance-subulate rather than ellipsoid or oblong-ovoid; and fewer (in *B. purpurascens* 16–20) and slightly larger seeds. In having seeds fewer than in *B. purpurascens*, *B. Longii* comes closer to *B. rosea* (Turcz.) Bunge of Siberia; but that species, of which three authentic collections are before me, has broader leaves; the stems very densely pilose with long hairs; the purple sepals 1.8–2.2 mm. long and densely pilose on the back; the narrowly obovate or spatulate-oblanceolate petals becoming wholly roseate and only 2.5–3.5 mm. long; the mature fruiting raceme but slightly elongated; the mature pedicels slender and elongating sometimes to 8 mm.; and the capsule oblong-ellipsoid and at most 6 mm. long. See pp. 77, 94.

Braya **americana** (Hook.) n. comb. *B. alpina*, *β. americana* Hook. Fl. Bor.-Am. i. 65 (1830). Planta perennis plerumque multicaulis; caulibus adscendentibus 1–10 cm. longis teretibus simplicibus purpurascentibus, pilis furcatis brevibus inaequalilongis griseis obsitis; foliis rosulatis carnulosis lineari-oblanceolatis 0.6–3 cm. longis 0.5–2 mm. latis integris glabris vel basi apiceque plus minusve ciliatis; racemo sub anthesi capitato-corymboso, fructifero 0.7–7 cm. longo densiuscule 3–20-floro, floribus infimis 1–3 distantibus plerumque in axillis foliorum superiorum; pedicellis 1–4 mm. longis arcte adscentibus; sepalis subpersistentibus plerumque purpurascentibus 1.5–2.5 mm. longis oblongis apice rotundatis margine hyalinis: petalis 1.5–4 mm. longis spathulato-oblanceolatis vel anguste obovatis albidis deinde roseis apice rotundatis; staminibus 1.5–3.5 mm. longis, antheris 0.3–0.5 mm. longis; pistillo lanceolato, ovario ovulis 10–16 pilis plerumque bifurcatis hirto, stylo gracili ovario valde angustiori, stigmate depresso-capitato stylo valde latiori manifeste bilobato; siliquis lanceolato-subulatis 4–7 mm. longis 1.3–2 mm. latis stylo gracili 0.5–1 mm. longo coronatis, valvis hirtellis, septo manifeste uninervo; seminibus anguste ovoideis 1–1.4 mm. longis 0.5–0.7 mm. latis brunneis.—Alberta and Newfoundland. The following have been examined. Alberta: Cataract Pass below Summit, August 4, 1908, *S. Brown*, no. 1457 (as *B. purpurascens*). Newfoundland: open soil on limestone barrens near Ice Point, St. Barbe Bay, July 14, 1925, *Wiegand, Gilbert & Hotchkiss*, no. 28,429; gravelly limestone barrens one mile back of Savage Cove, Straits of Belle Isle, July 14, 1925, *Fernald & Long*, no. 28,428, July 23, *Fernald, Pease & Long*, no. 28,438; gravelly limestone barren, Four-mile Cove, Straits of Belle Isle, July 20, 1925, *Fernald, Wiegand & Long*, no. 28,437; moist gravel of limestone barrens on the Highlands northeast of Big Brook, Straits of Belle Isle, July 15, 1925, *Pease & Griscom*, no. 28,430; gravelly and peaty limestone barrens back of Big Brook, July 15,

1925, *Fernald & Long*, no. 28,431; swale near mouth of brook, Watts Bight, Straits of Belle Isle, July 19, 1925, *Pease, Griscom, Gilbert & Hotchkiss*, no. 28,436; sandy and clayey spots in limestone gravel-barrens, Boat Harbor, Straits of Belle Isle, *Fernald, Wiegand & Long*, no. 28,435; dry rocky and gravelly limestone barrens and boggy depressions in limestone barrens, Cape Norman, July 18, 1925, *Wiegand, Griscom & Hotchkiss*, nos. 28,433, 28,434, August 13, 1925, *Wiegand & Long*, no. 28,440; dry limestone barrens, Burnt Cape, Pistolet Bay, July 17, 1925, *Fernald, Wiegand, Pease, Long, Griscom, Gilbert & Hotchkiss*, no. 28,432, August 5, 1925, *Fernald & Long*, no. 28,439.

Although I have not seen the Drummond material upon which Hooker founded *Braya alpina, β. americana*, there is scarcely any question that the plant of northern Newfoundland with small pinkish flowers and hirtellous siliques is identical with the Drummond plant. After detailed study I placed the Newfoundland material close to *B. alpina* Sternb. & Hoppe of the European alps. From that species it differs in its narrower leaves, mostly shorter pedicels and sepals, much narrower petals with rounded rather than emarginate apex, slender and columnar rather than tumid style, broader and sharply defined stigma, and shorter lance-subulate rather than linear-cylindric siliques. The only material at hand from the region whence Drummond collected the type of *B. alpina, β. americana* is Stewardson Brown, no. 1457. That material is so close to the Newfoundland plant that at least until one knows more about it, it would be quite unwise to attempt to separate them. Brown's material is in anthesis, Drummond's was in fruit; but the one point emphasized by Hooker, "stylo longiusculo gracili" is clearly shown in it.

O. E. Schulz[1] places *B. alpina, β. americana* with doubt under the Siberian *B. siliquosa* Bunge; but, as he clearly states, Bunge's species has linear siliques up to 1.5 cm. long. These are well shown by Trautvetter,[2] who also illustrates the leaves as broadly oblanceolate and definitely toothed. The American plant with its more slender and strictly entire leaves and its very short siliques is certainly not *B. siliquosa*. See pp. 96, 97, 98, 106.

? Braya Richardsonii (Rydb.) Fern. Sandy and clayey spots in limestone gravel-barrens, Boat Harbor, *Fernald, Wiegand & Long*, no. 28,441, very scarce, only two sterile plants found, but apparently the Canadian Rocky Mt. species. See p. 107.

[1] O. E. Schulz in Engler, Pflanzenr. iv.[105] 231 (1924).
[2] Trautv. Imag. Descr. Fl. Ross. 34, t. 23 (1844).

(*To be continued.*)